

## **REMARKS**

This Amendment, in connection with the following remarks, is submitted as being fully responsive to the Final Office Action. Claims 1 and 3-34 are pending in the present application. Claims 1-6, 8-10, 15-18, 20, 23, 25, 28, 29, 32 and 33 have been amended. No new matter has been added. Support for the amendments to said claims can at least be found, for example, in the Specification at ¶ [0024]. Claims 1, 13, 20, 23, 25 and 33 are the independent claims. Favorable reconsideration is requested.

Claims 1-34 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,970,464 to Apte et al. (“Apte”) in view of U.S. Patent No. 4,975,840 to DeTore et al. (“DeTore”) and further in view of U.S. Patent No. 5,893,072 to Zizzamia (“Zizzamia”). Applicants respectfully traverse, both as to the sufficiency of these rejections themselves, as well as by way of the Declaration of Frank M. Zizzamia Detailing Secondary Considerations Of Nonobviousness Of The Claimed Invention, submitted herewith.

### **I. Traversal of 35 U.S.C. §103(a) Rejections**

Claim 1 is directed to a method for predicting the profitability of an insurance policy. The claimed method comprises the steps of gathering policyholder data including premium and loss data for storing in a database and identifying external data sources directed to at least one of business level data and household demographics data. The external data sources are such as have a plurality of external variables to be used in predicting the profitability of the insurance policy. The method further provides for associating the external variables with the policyholder data, evaluating the associated external variables against the policyholder data to identify the individual external variables predictive of the insurance policy’s profitability, and

creating a score based on an independently weighted multivariate statistical model based on the individual external predictive variables. Further, the evaluating of external variables includes evaluating the utility of creating new variables from the external variables and creating any appropriate new variables, and the score is a function of at least all of the predictive external variables and any predictive new variables.

The remaining independent claims have similar features.

A noteworthy feature of the method of claim 1 is the generation of a score based on the independently weighted statistical model based upon the individual external predictive variables and any predictive new variables. As described in the specification, although external data sources offer one of the best opportunities to obtain the characteristics of a business and/or the practices of an owner of the business property to be insured, commercial insurance companies' use of such data to supplement their conventional pricing methods has been at best haphazard, inconsistent, and non-systematic. Specification at ¶ [0009].

According to a described exemplary embodiment, after collection, such external data can, for example, be culled to eliminate highly repetitive predictor variables, and the remaining variables can, for example, be included in a multivariate statistical model.

*Specification* at ¶¶ 83-89. Additionally, new variables can be created from the external data. Such new variables are combinations of or derived from external variables obtained from the external data sources. Once the predictive variables are obtained (*i.e.*, both external variables and created or derived new variables), ***each predictor variable can, for example, be assigned a separate co-efficient.*** *Id.* at ¶¶ 86-87. Thus, the present invention is a data driven approach, where identification of external predictor variables and predictive new variables, and the weights

to be assigned them, are generated from a statistical analysis operating on large amounts of historical data obtained from a variety of sources, as described above. *Id.* at ¶¶ 70-89. The statistical analysis determines the optimal weighting of such predictor variables:

The development process of the predictive statistical model generates the mathematical formula's coefficients. One example of the form of such a simplified equation might be as follows:  $a_0 + a_1x_1 + a_2x_2 + \dots + a_Nx_N = y$ . In this example, the "a's" are the coefficients, the "x's" are the individual predictor variables, and "y" is the score, i.e., the indication of commercial insurance profitability. The "a<sub>0</sub>" is the mathematical "y-intercept".

*Id.* at ¶ 86.

In the Final Office Action (at page 3, item 3(A)(4)), Apte is cited at its Abstract, 3:44-53, 6:44-7:17, and Figs. 1-14 as teaching creating an individually weighted statistical model based upon said individual external predictive variables. Applicants respectfully traverse. In none of these passages does Apte teach or even suggest an independently weighted multivariate statistical model or a score based thereon, where said score is a function of at least all of the predictive external variables and any predictive new variables.

Apte is a rule based system. It has no score utilizing a weighted contribution from a set of predictive variables. It does not generate new variables from external data, or determine if that is appropriate. It has no "model" other than a set of rules:

When the Viewer tab is selected, the viewer screen shown in FIG. 8 is displayed. This screen allows a user to see in further detail particulars about a model or an edited rule set that has been selected from the existing models screen. In addition to identifying the database name on which the model was trained or evaluated, this screen also displays the accuracy estimate of the model in terms of several statistics. Also, the rules that comprise this model will be available for inspection in this screen. One individual rule will be displayed at a time, but a scroll facility allows the entire rule set to be scrolled through for a rule.

Apte at 6:45-56.

In fact, all Apte has are rules. Fig. 8 shows in detail “Rule 4.” Rules, such as Rule 4 of Fig. 8 of Apte, are not a score that is a weighted multivariate expression of all the predictive variables being used. The rules in Apte are used to perform a scenario analysis that displays an output shown in Fig. 13 of Apte. All Apte has to say about this output is the following:

Once specified, and the "Analyze" button selected from the "File" pull down menu, the system will perform a scenario analysis, and display to the user, in a subsequent screen, a detailed segmentation report.

Apte at 8:67 – 9:3.

Looking at Fig. 13 of Apte, one does not see any score at all. One sees only a set of rules, their percentage of coverage of the scenario, and various conclusions from applying the various rules to the scenario. One does not see generation of a score from an individually weighted multivariate statistical model, or any mention that said score be a function of at least all of the predictive external variables and any predictive new variables.

Corroborating this lacuna in Apte, at page 21 of the Final Office Action the Examiner seems to state conclusorily, without any particular source or citation at all, that “the use of various statistical techniques, such as multivariate models, independently weighted multivariate models ..... are notoriously well known and obvious, and have been utilized by insurance artisans prior to Applicants’ invention. As such the aforementioned features claimed by Applicant are deemed insufficient to substantively distinguish Applicants’ claimed invention over the prior art.”

Respectfully, this is not a response. It seems to say that the Examiner does not “feel” that the claimed invention is patentable, although none of the references cited, whether

alone or in combination, actually teach it. As noted, the citations to Apte do not teach this feature. If the Examiner has a specific reference in mind that teaches creating an individually weighted multivariate statistical model based on said individual external predictive variables, Applicants formally request that it be cited. In the absence of such a reference, the rejection is respectfully traversed.

DeTore is directed to a 1980s vintage artificial intelligence (“AI”) system, of the expert system type. As such, it seeks to use the accumulated knowledge of experts to evaluate the risk of a proposed insurance policy and thus make underwriting decisions. “Underwriting knowledge base 24 is the information base that drives the system.” DeTore at 4:54-55. The knowledge base incorporates the information contained in the underwriting manuals used by the assignee of DeTore, as well as factual elements and programmed knowledge in the form of expert modules. *Id.* at 4:55-5:3. DeTore is designed for non-expert underwriters to underwrite potential insurance business. They do this by accessing the expert system.

In similar fashion to Apte, DeTore describes a qualitative, rule driven approach, which uses various rules to match identified “problems” from the application data base to a corresponding “impairment” from the underwriting database, and then assigns weights (debits or credits) to the identified problems based upon information (*i.e.*, other rules) in the underwriting database. A problem is not an external datum or related to external data! A problem is defined as follows:

For purposes of this discussion, the term “problem” will generally mean an element of information (e.g., facts and conditions such as age, a medical condition, a hazardous avocation, a smoking or drinking habit, etc.) stored in application data base 20 which impacts either positively or negatively upon the relative mortality of the proposed insured. The term “impairment” will generally mean an element of information (e.g., the impacts of aging, various medical

conditions, avocations, smoking, drinking, etc. on the mortality of known populations) stored in underwriting knowledge base 24 which relates to or corresponds with the information contained in application data base 20. Each impairment is associated with textual information and/or an expert system or module which is intended to assist the system operator in quantifying the impact of a particular problem (by reference to a corresponding impairment) upon expected mortality in a particular instance.

DeTore at 5:40-57.

Once the weights have been assigned to the identified problems (again, not any external data), they are then combined to generate a risk classification for the proposed insurance. DeTore at 5:40 – 6:2. Thus, in DeTore, any contribution from a “problem” is determined *a priori*, by an expert module. If there is no expert module available for a given “problem” the problem is normally left “unresolved” unless the underwriter (now an actual human) is himself an “expert” in the subject area of concern. *Id.* at 15:20-34. ***At no time is external data mined to identify predictor variables and then further processed to assign weights consistent with the data given a statistical analysis. At no time are new variables created from external variables, or is the utility of such creation evaluated.*** All DeTore teaches is assigning weights to internal problems – information stored in the application database, i.e., provided by an applicant for insurance -- *a priori*, using expert modules or, where no expert module is available, using a human expert acting “on the fly.” *Id.*

The Final Office Action cites to DeTore at page 4 of the Final Office Action (Item 3(A)(5)), as teaching “evaluating the associated external variables against the policyholder data to identify the individual external variables predictive of the insurance policy’s profitability.” (emphasis added). This is respectfully untrue, and traversed. DeTore does not use external data at all. DeTore does not teach creation of a multivariate statistical model, or teach generating a

score based thereon. DeTore wholly ignores the issue of creating new variables from external data sources.

Thus, DeTore is not seen by Applicants as curing the deficiencies of Apte as a reference against claim 1, and the combination of references used in the Final Office Action to teach elements (4) and (5) of claim 1 fails, and is traversed.

Thus, Applicants respectfully assert that Apte and DeTore, even when combined, do not teach operating upon external data to evaluating the utility of creating new variables from the external variables and creating any appropriate new variables, or creation of a statistical model from all predictive variables utilizing a multivariate statistical approach.

Zizzamia is directed to personal lines insurance products, not predictively scoring commercial policies of insurance as to profitability. Zizzamia does not cure the deficiencies of Apte or DeTore as a reference against the claimed invention. Zizzamia's sole reference to a multivariate statistical model is the following:

The predictor 32 must produce a predicted loss ratio given a set of classification plan variable values. Multivariate statistical modeling curve fitting techniques provide a method for creating such a predictor. Curve fitting techniques generate a correspondence between prescribed sets of inputs and outputs. One such technique is multiple regression, described in "Intermediate Business Statistics: Analysis of Variance, Regression and Time Series" by Robert Miller and Dean Wichern, incorporated herein by reference.

However, in the preferred embodiment, the loss control system 8 employs neural network modeling algorithms executed on computational hardware to generate signals indicative of the predictive apparatus 12. A neural network is a nonlinear general purpose function approximator which is trained to learn an unknown function based on known inputs and corresponding outputs. Once the neural network learns the unknown function, the neural network is able to generate outputs for other sets of inputs, even input patterns to which the network was never exposed. Neural network topologies and training techniques, specifically those used in the preferred embodiment as disclosed hereinafter, are

described in "Neural Networks: A Comprehensive Foundation" by Simon Haykin, also incorporated herein by reference.

Zizzamia at 9:18-42.

Zizzamia obviously advises against using multivariate statistical modeling curve fitting techniques, and endorses the use of neural networks. Because Zizzamia is directed to personal lines insurance products, which require that an insurer list all of the underwriting factors it uses, Zizzamia does not, and could not, teach evaluating the utility of creating new variables from the external variables and creating any appropriate new variables. There is no possibility to add any data driven predictive variables after an insurer's set of factors has been filed with a state regulatory agency. Moreover, Zizzamia does not describe generation of any score from an individually weighted multivariate statistical model, and also fails to describe that said score be a function of at least all of the predictive external variables and any predictive new variables.

In contrast, the claimed invention, inasmuch as it is applicable to commercial lines, involves a gamut of variables that are neither disclosed nor included on any insurance regulatory rating classification plans on file with State Insurance Departments. The reference to the use of a multivariate statistical model in Zizzamia is limited to the adjustment of the absolute value of already disclosed factors in such regulatory rating classification plans for the sole and expressed purpose of optimizing such disclosed factors' values.

For at least these reasons, amended claim 1 is asserted as patentably distinguished over Apte, DeTore and Zizzamia, whether taken alone or in any combination.

The remaining independent claims, claims 13, 20, 23, 25 and 33, recite similar features as does claim 1, and are thus also urged as patentable over Apte, DeTore and Zizzamia. The dependent claims are thus also urged as patentable for similar reasons.



## **II. Declaration of Frank M. Zizzamia**

Submitted herewith is the Declaration of Frank M. Zizzamia Detailing Secondary Considerations Of Nonobviousness Of The Claimed Invention. For the reasons detailed therein, the rejections of all claims under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. Apte in view of DeTore and further in view of Zizzamia are traversed based on the secondary considerations of nonobviousness presented. Thus, claims 1 and 2-34 are asserted as nonobvious and patentable over these references.

If any questions remain as to the patentability of the pending claims, Applicants respectfully request the opportunity to have an interview with the Examiner, review same, and present their point of view. The Examiner is thus invited to notify Applicants' undersigned attorney if such questions remain so that an interview can be scheduled.

In the Request for Continued Examination submitted herewith, Applicants have requested that prosecution be suspended for a period of three (3) months. Applicants reserve the right to file a Supplemental Amendment within the suspension period pursuant to 37 C.F.R. 1.103(c) and MPEP 714.03(a). Given that the Examiner formerly assigned to this case has changed, Applicants would like the benefit of a personal interview with the new examiner to present the claimed invention and discuss the rejections contained in the Final Office Action, so that any Supplemental Amendment can best advance this application towards allowance.

No additional fees are believed due herewith. If any additional fees are due, the Commissioner is hereby authorized to charge any fee deemed necessary for the entry of this Amendment to Deposit Account No. 50-0540.

Dated: **March 6, 2008**

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Aaron S. Haleva', written over a horizontal line.

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